MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2022/2023 (TERM ID 2210 & TERM ID 2215)

TDB1131 – DATABASE SYSTEMS

(All sections / Groups)

15 FEBRUARY 2023

2.30 p.m. – 4.30 p.m.

(2 hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 4 **QUESTIONS.**
2. Attempt all questions.
3. You are allowed to use calculators in this examination.
4. Please write all your answers in the Answer Booklet provided

QUESTION 1

(a) The Gill Art Gallery wishes to maintain these data: customers, artists and paintings. They may have several paintings by each artist in the gallery at one time. Paintings may be bought and sold several times. In other words, the gallery may sell a painting, then buy it back at a later date and sell it to another customer.
Based on the given scenario, describe the end users, procedure and data in the environment of database systems with related examples. [3 marks]

(b) Refer to Table 1 which shows the transaction process of a database system. R indicates read, W indicates write and C indicates committed. A and B indicate the table.

Table 1. Concurrent Transactions

Timestamp	Transaction 1	Transaction 2
10001	R1[A]	R1[A]
10002	R1[B]	W1[A]
10003	W1[B]	C1[A]
10004	W2[B]	R1[B]
10005	W3[B]	W1[B]

(i) Are there any conflicts in the transaction? Justify your answer. [1 mark]

(ii) Show how the lock can be implemented in Table 1 to resolve the conflicts. You need to redraw the table. Lock is indicated by using L and release lock is Re. [2 marks]

(c) JExpress is a delivery company with branches in all the states in Malaysia. The CEO of the company, Mr Ooi wants to fragment the databases where the data is stored near to its demand according to location. The entities in the databases include Customer, Order, OrderDetails, and Delivery. There are a lot of branches where the fragment node may be problematic to remember.

(i) Which type of fragmentation suits Mr Ooi's requirement? Justify your answer. [1.5 marks]

(ii) There are three levels of distribution transparency. Which one is the best for JExpress? Justify your answer. [1.5 marks]

(iii) Based on your answer in (ii), provide a sample of SQL commands to illustrate the distribution transparency. This query is retrieving all the customer information where Cus_Location is in East Malaysia. [1 mark]

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QUESTION 2

Property No	MLK215
Street	Jln. Sutera Emas 3
City	Bukit Katil
Postcode	75450
Type	Double storey
Rooms	4
Rent	RM1200.00
Owner	Susan Tay Lin Ming
Contact No	012-5858222
Description	Newly decorated throughout. Well equiped furnitures.

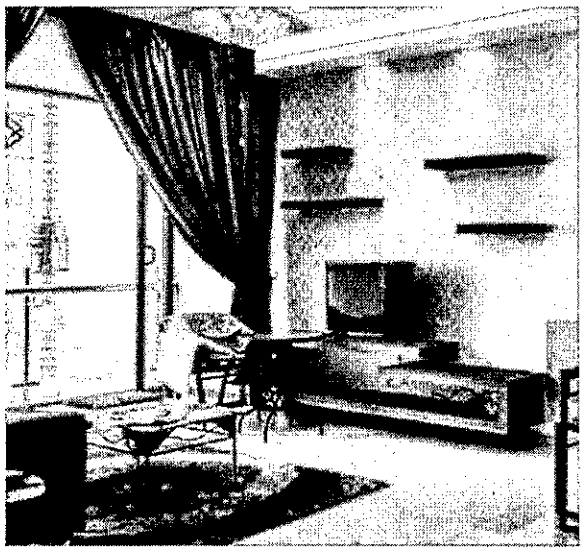

Figure 1. Form of Property for Rent

A landlord who wants to rent the properties, can register themselves through the website of GreatHouseRent. After the owners have registered as a user, they need to login and fill up the property form (refer Figure 1). Based Figure 1, answer the following questions.

(a) Identify the repeating groups in Figure 1 and justify your answer. [1 mark]

(b) Provide the composite keys and attributes of first normal form. [2 marks]

(c) Illustrate the 2nd and 3rd normalization (if any). Indicate the primary key and foreign key. [3 marks]

(d) List down the new attributes which enhance the design of answer in (c). [1 mark]

(e) Which development life cycle phase is normalization in? [1 mark]

(f) What are the other main procedures that you must carry out in the life cycle phase which you have answered in iv besides normalization? List out at least **TWO**. [2 marks]

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QUESTION 3

Mr. George is in the midst of starting up an online book shop where the provided services include lending e-books, selling physical books (new and second hand). He has identified the process of this business as below: Each member has a specific ID. Their demographic information is kept in the system. Each member can lend a maximum of 6 e-books. Each e-book can loan to a maximum of 5 users. The lending term is less and equal to 21 days. Users can apply for extension at most 3times. Lending fees are charged accordingly. Physical books are shipped once the book is sold. Each user may purchase many books or none.

Based on the above-mentioned scenario, solve the following problems.

(a) Identify **TWO** business rules. [3 marks]

(b) Based on your business rules in (i), draw the crow's foot entity relationship diagram (ERD), including the primary key, foreign key, attributes (at least **TWO**) and bridge entities (if any). [7 marks]

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QUESTION 4

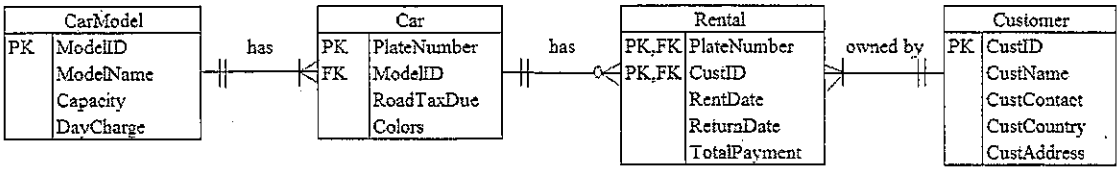

Figure 2. ERD

The entity relationship diagram (ERD) of a car rental shop is shown in Figure 2. Solve the following questions with appropriate SQL commands.

(a) Create the table Car. Table 1 shows the sample output of Car. The data is deleted with restriction. [3 marks]

Table 1. Table Car

Plate Number	Model ID	Road Tax Due	Colours
MOB1123	TYT123	12/1/2023	White
WEM3566	HD12	25/5/2023	White
VA1123	PS3	31/12/2022	Gray

(b) List down the number of rentals per car from 1-1-2022 to 30-6-2022. The list down information must include the plate number, model id, colours and number of rentals. [2.5 marks]

(c) A customer with ID CU12366 requested a change of his ReturnDate to 22/05/2022 for the car with plate number WEM3566. [1.5 marks]

(d) Create a function that count the total payment. This total payment is obtained by calculating the number of days to rent. Assume the charges per day is RM100. [3 marks]

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